

REMARKS

Claims 1, 3-6, and 8-15 are pending. Favorable reconsideration is respectfully requested.

The present invention relates to a polyether obtained by reacting 1-butene oxide and an alcohol in the presence of a double metal cyanide compound as a catalyst, where the content of unsaturated components is 8 mol% to 30 mol%.

See Claim 1.

The present invention also relates to a process for preparing the polyether by reacting 1-butene oxide and an alcohol having 2 to 24 carbon atoms in the presence of a double metal cyanide compound as a catalyst. See Claim 6.

The rejection of the claims under 35 U.S.C. §103(a) over Vogel et al. in view of Combs et al. is respectfully traversed. The cited references fail to suggest the claimed polyether.

Vogel et al. disclose a motor fuel for internal combustion engines containing a small amount of an additive comprising as one component a polyether based on propylene oxide or butylene oxides and having a molecular weight of not less than 500. See the Abstract. Vogel et al. do not disclose that the polyethers contain unsaturated compounds in an amount of 8 mol-% to 30 mol-%. In addition, Vogel et al. does not disclose how the polyethers are obtained. Also, the reference fails to disclose which compounds are used as substrates, and if catalysts are present in the preparation procedure.

According to the Examiner, Combs et al. teach that polyoxyalkylene monoethers that are normally made by basic catalysis, include significant concentrations of alkoxyated unsaturateds. The Examiner also takes the position that one having ordinary skill in the art at the time the invention was made would have found it obvious that the polyethers based on propylene oxide or butylenes oxides as disclosed by Vogel et al have significant

concentrations of alkoxyated unsaturates, i.e., more than 6 mol-%, since Combs et al. teach that polyoxyalkylene monoethers normally made by basic catalysis have significant concentrations of alkoxyated unsaturates.

However, Combs et al. cannot teach that the polyethers that are presented in Vogel et al. are prepared by basic catalysis. Although Vogel et al. is a reference that is cited in Combs et al., this does not mean that the polyalkylene oxides that are disclosed in Vogel et al. are prepared by basic catalysis, because nothing points in the direction of basic catalysis for the preparation of the compounds described in Vogel et al.

The Inventors of the present application have found that if an alcohol is alkoxyated with 1-butene oxide in the presence of DMC catalyst, polyether mixtures can be obtained having a high amount of unsaturates of 8 mol-% to 30 mol-%, as specified in Claim 1.

Vogel et al. cannot suggest these polyether mixtures, because the reference does not mention the presence of unsaturated compound at all. In addition, Vogel et al. preferably use propylene oxide as the alkylene oxide, and therefore, a person of ordinary skill in the art would not take Vogel et al. into account looking for a polyether mixture specified in Claim 1 of the present application.

In addition, Combs et al. teach that polyalkylene oxides that are prepared in the presence of DMC-catalyst have low amounts of unsaturates. A person of ordinary skill in the art would not learn from this disclosure that the specific combination of 1-butene oxide, an alcohol and a DMC-catalyst gives rise to polyether mixtures having amount of unsaturates of 8 mol-% to 30 mol-%, as specified in Claim 1.

As discussed above, the polyethers that are disclosed in Vogel et al. are not prepared under basic catalysis. Accordingly, it is not implicitly taught by Vogel et al. that the polyethers that are disclosed in Vogel et al. have high amounts of unsaturates.

Therefore, the polyether according to Claim 1, and claims dependent thereon, are not obvious in view of Vogel et al. and Combs et al. Accordingly, withdrawal of this ground of rejection is respectfully requested.

The rejection of Claim 6 under 35 U.S.C. §112, first paragraph, is respectfully traversed.

Claim 6 specifies that an alcohol having 2 to 24 carbon atoms is reacted with 1-butene oxide in the presence of a double metal cyanide compound as catalyst. The Inventors have found that if an alcohol having 2 to 24 carbon atoms is reacted with 1-butene oxide under DMC catalysis, polyethers are obtained that have high amounts of unsaturates, e.g. as specified in Claim 1. Eleveld et al. teach that alkylene oxides chosen from ethylene oxide, propylene oxide, butane oxides, styrene oxide and the like and mixtures thereof can be polymerized in the presence of DMC-catalyst, to give a polyol having a molecular weight of, e.g., 3000, see Example 2 in column 10. Eleveld et al. do not disclose a process in which alcohols having 2 to 24 carbon atoms are alkoxyated with 1-butene oxide. Therefore, a person of ordinary skill in the art would not learn from Eleveld et al. that the reaction of alcohols having 2 to 24 carbon atoms with 1-butene oxide in the presence of a DMC catalyst gives rise to compounds having low amounts of unsaturates. In addition, Combs et al. disclose polyoxyalkylene monoethers that are obtained by reaction of an alcohol with alkylene oxides chosen from propylene oxide, butane oxides and ethylene oxides, see column 2, lines 41 to 58 of Combs et al. Combs et al. teach that polyoxyalkylene monoethers that are prepared in the presence of a DMC-catalyst have very low concentrations of alkoxyated unsaturates, i.e. less than about 6 mol-%, see column 3, lines 34 to 51 of the reference. According to the present invention, it has surprisingly been found that if a C<sub>2</sub>-C<sub>24</sub>-alcohol is alkoxyated with 1-butene oxide in the presence of a DMC-catalyst, polyether mixtures are obtained having high amount of 4.2 mol-%, see Experiment 7 in Table 1 on page 13. The

very specific combination of 1-butene oxide, a DMC catalyst and a C<sub>2</sub>-C<sub>24</sub>-alcohol gives rise to polyether mixtures having high amount of unsaturates of 8 mol-% to 30 mol-%, as claimed in Claim 6 of the present application. Therefore, Combs et al. cannot teach that this specific combination gives rise to polyether mixtures having a high amount of unsaturates.

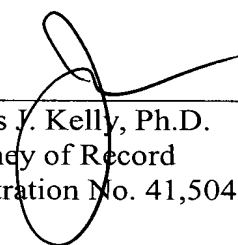
Accordingly, a person of ordinary skill in the art does get all of the information from Claim 6 that is needed in order to obtain polyether mixtures according to Claim 1 by the process according specified in Claim 6. The combination of al alcohol having 2 to 24 carbon atoms, 1-butene oxide and a DMC catalyst always provides the claimed amount of unsaturates.

Therefore, withdrawal of this ground of rejection is respectfully requested.

Applicants submit that the present application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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(OSMMN 06/04)